

# Samuel Rivera

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## SUMMARY

Applied scientist with 10+ years of experience designing and implementing machine learning solutions for petabyte scale.

## EDUCATION

### THE OHIO STATE UNIVERSITY

#### PHD IN ELECTRICAL ENGINEERING

Dec 16, 2012 | Columbus, OH

Concentration in machine learning and statistical pattern recognition

#### MS IN ELECTRICAL ENGINEERING

March 18, 2012 | Columbus, OH

### UNIVERSITY OF DELAWARE

#### BE IN ELECTRICAL ENGINEERING

May 15, 2007 | Newark, DE

Concentration in signal processing  
Minors in Math and Physics

## PATENTS

US Patent Application: Systems and Methods of Tuning Sensor Devices  
Filed April 15, 2022 (pending)

## TECH STACKS

**BUILDING:** Python • PySpark • SQL • PyTorch • Numpy • Scipy •

scikit-learn • Pandas • seaborn • plotly/dash • pytest • optuna • OOP

**TOOLS:** terminal • EMR • Docker • git • RDBMS • NoSQL

**DOCS:**  $\LaTeX$  • Markdown • Jira / Trello

**PAST PROJECTS:** R • MATLAB • Keras • TensorFlow • C • C++ • Julia

## SOCIETIES & HONORS

2016 1<sup>st</sup> place team, AFRL LabHack Hackathon (Dayton, OH) • Tau Beta Pi • Eta Kappa Nu • Alpha Psi Lambda • Society of Hispanic Prof. Engineers

## PUBLICATIONS

Five journals and several conferences:  
<https://samuelrivera.info/publications/>

## EXPERIENCE

### AMAZON WEB SERVICES (AWS) | RESEARCH SCIENTIST

June 13, 2022 – Present | Denver, CO

- Leveraged AWS SageMaker and foundation large language models (LLMs) to build and deploy a document question answering chat bot with 0-shot learning
- Built big data aggregation and visualization pipelines leveraging SQL, PySpark, and AWS EMR. Queried both RDBMS (Redshift) and NoSQL (DynamoDB).
- Developed anomaly detection algorithms at hundred million users per minute scale. Experienced with statistical, forecasting, and deep learning approaches.
- Developed an A/B model evaluation strategy for production algorithms. Improved recall by 70% while maintaining the false-alarm rate
- Designed, built and deployed a ground-truth anomaly detection verification bot leveraging Amazon Elastic Compute Cloud (EC2) and AWS infrastructure

### BALL AEROSPACE | PRINCIPAL ENGINEER, MACHINE LEARNING TEAM

March 29, 2021 – May 12, 2022 | Boulder, CO

- Implemented custom self supervised deep learning architectures for object detection using vision transformer and other backbones
- Implemented time-series forecasting models (VAR) for prediction
- Tuned and deployed deep networks on Linux servers with Docker containers
- Defined and built machine learning solutions to a variety of problems while mentoring junior engineers to help execute the work
- Developed the infrastructure to rapidly iterate over alternative algorithms for custom optimization problems (gradient descent, Bayesian optimization, etc.)
- Performed data analysis and visualization for deciding problem characteristics, solution feasibility, and solution approach from first principles and data insights
- Applied self-supervised deep learning (SSL) approaches for classification in impoverished data settings

### MATRIX RESEARCH | RESEARCH ENGINEER, TARGETING AND NAV

April 28, 2016 – February 26, 2021 | Dayton, OH

#### • ALGORITHMS AND TECHNICAL WORK

- Experienced in numerical Python ecosystem (Numpy/Scipy/scikit-learn), data analysis, visualization, modeling, OOP, and software best practices
- Technical lead applying single-shot (YOLO) and region based (R-CNN) deep learning frameworks for automatic target recognition (ATR)
- Improved detection accuracy (with synthetic data) over baseline by 30%
- Published adversarial domain adaptation (GAN) algorithms for unsupervised transfer learning; applied these across multiple projects
- Derived and implemented probabilistic graphical models (Bayesian networks) for signal ID in ambiguous radar environments
- Implemented a multiple hypothesis tracker and performance prediction verification using physics based simulation libraries

#### • LEADERSHIP AND BUSINESS DEVELOPMENT

- Oversaw all aspects of research including proposals, cost planning, algorithm derivation, implementation and deployment, and reporting
- Mentored ATR Center Summer School student-researchers and interns in ML and research methods for satellite imagery and DNA classification